Space Weather Forecast

Issued on Saturday, 02 April 2022 at 01:31 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: Moderate flares likely (R1/R2 Radio Blackouts), with a slight chance Strong-flares (R3 Radio Blackouts). G1-G2 Minor to Moderate geomagnetic storms possible, mainly day 1 (2nd) from coronal mass ejection and arrival of fast solar wind.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was Low with a number of common flares observed. There are seven sunspots on the Earth-facing disc, including the recently active region in the northwest that produce recent Moderate and Strong flares. While this has shown some signs of simplification, this is now approaching the west limb resulting in some difficulty to assess and maintains sufficient flux for similar strength flares. A further moderately large sunspot near this region has also shown some growth, whilst a new small region developed between these two spots. There are also two sunspots on interest in the southeast, one of which saw notable growth in intermediate spots, whilst the smaller region has some moderate magnetic complexity. The other two regions remained small and simple. No Earth-directed CMEs (coronal mass ejections) were observed in the last 24 hours, whilst the CME from the Moderate flare on the 31st was assessed as missing.

Solar Wind / Geomagnetic Activity: Earth has seen the influence of a recent CME arrival recede, although solar wind speeds remained elevated. The strength of the interplanetary magnetic field carried by the solar wind decreased from strongly positive values (northward) to weakly negative (southward) after midday. Due to the main strength of the magnetic field being in the positive direction, geomagnetic activity from the recent CME arrival was more muted that if it had been in a negative direction. Activity was Unsettled to Active at first (Kp3-4), but eased to mainly Quiet (Kp2).

Energetic Particles / Solar Radiation: The count rate of high energy particles (protons) has been decreasing around the Earth, back towards background levels after recent enhancements. No solar radiation storms occurred.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to become Moderate each day, with a slight chance of becoming High, primarily due to the recently active sunspot, but also the other large active regions on the disc. This risk reduces later in the period as two of these sunspots rotate away, over the west limb, to no longer be on the Earth-facing disc.

Solar Wind / Geomagnetic Activity: There is one potentially Earth-directed CME, from the Strong flare on the 30th. Whilst this is low confidence, with some potential for the CME to miss or only give a glancing impact, arrival is currently expected during the afternoon of day 1 (2nd). There is also the potential for the fast wind from a coronal hole to arrive day 1 (2nd), and could perhaps combine with the CME arrival. Ongoing CME and fast wind effects will then gradually wane day 2 and early day 3 (3rd and 4th), with solar winds easing back to background day later in the period. Geomagnetic activity will initially be Quiet to Active, but easing, before a chance of G1/G2 Minor to Moderate storms with both CME arrival, and CH fast wind enhancements day 1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

(2nd). These have an ongoing potential through day 2 (3rd) before a return to mainly Quiet to Unsettled conditions is then expected day 3 and 4 (4th and 5th). These geomagnetic conditions will give the potential for visible aurora across northern UK, mainly areas of Scotland and similar latitudes where a clear northern horizon is visible.

Energetic Particles / Solar Radiation: The count rate of high energy particles (protons) has the potential to rise at times during the period, due to any large flares that occur, primarily from the already active sunspot region. This gives a slight chance of solar radiation storms, although this risk will recede later in the period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	70	40	5	1
Strong	G3	No	5	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	70	70	60	50
Very Active	R3 to R5 X	No	15	10	5	5

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	15	10	10	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.